

On a simple Approximate Method of calculating the Effect of Refraction upon the Distance and Position-angle of Two Adjacent Stars. By Robert S. Ball, Esq., Royal Astronomer of Ireland.

In connection with the Parallax Observations on which we are engaged at Dunsink I have found it convenient for some purposes to construct the four small tables here given. These tables show by inspection the corrections in tenths of a second of arc to the distance, D, and in whole minutes to the position-angle, p.

The distances in our measurements are generally under 300". The tables only refer to zenith distances between 45° and 70°. Between 45° and the zenith the correction to the position-angle is presumed to be negligible and the correction to the distance may be taken at + 0".1 per 300". Below 70° of zenith distance more accurate calculations would be required than the tables can give.

TABLE I.
Refractions, Distance, and Position.
North Declination.

10°	20°	30°	40°	50°	60°	70°	80°	
1.0	2.6	3.6	4.3	5.1	5.9	7.0	10	
13	33	43	49	55	58	56	25	45°
2.0	3.2	4.1	4.9	5.8	6.6	8.2		
23	35	43	48	51	50	40		50
2.8	3.9	4.7	5.6	6.4	7.5	9.7		
29	38	43	47	47	43	25		55
3.5	4.5	5.3	6.1	7.2	8.7			
33	39	43	44	41	33			60
3.9	4.7	5.6	6.5	7.7	9.5			
36	39	42	42	38	24			63
4.2	5.1	6.0	7.0	8.2	11.0			
36	40	42	40	34	10			66
4.4	5.4	6.2	7.3	8.6				
36	40	40	37	30				68
4.6	5.6	6.5	7.6	9.0				
35	39	39	35	27				70

TABLE II.

Position-Angle—Parallactic Angle.

Zenith Distance.	360	350	340	330	320	310	300	290	280	270
	180	190	200	210	220	230	240	250	260	270
	180	170	160	150	140	130	120	110	100	90
	0	10	20	30	40	50	60	70	80	90
45°	2		2	I	I	I	I	I	I	I
50	2	2	2	2	2	I	I	I	I	I
55	3	2	2	2	2	2	I	I	I	I
60	3	3	3	3	2	2	I	I	I	I
63	4	4	4	3	3	2	2	I	I	I
66	5	5	5	4	3	3	2	I	I	I
68	6	6	5	5	4	3	2	I	I	I
70	7	7	6	5	4	3	2	2	I	I

TABLE III.

Position-Angle.

Parallactic Angle.	0	20	40	60	80	100	120	140	160	180
	180	200	220	240	260	280	300	320	340	36
	-50	-V	-IV	-II	-I	0	0	-II	-III	-V
	-30	-IV	-V	-IV	-II	-I	0	0	-I	-III
-10	-II	-III	-III	-II	-I	+I	+II	+I	0	-II
+10	+II	0	-I	-II	-I	+I	+II	+III	+III	+II
+30	+IV	+III	+I	0	0	+I	+II	+IV	+V	+IV
+50	+V	+V	+III	+I	0	0	+I	+II	+IV	+V

TABLE IV.

Zenith Distance.	0	I	II	III	IV	V
	45°	0	0	0	I	I
	50	0	0	I	I	I
	55	0	0	I	I	2
60	0	I	I	2	2	3
63	0	I	I	2	3	4
66	0	I	2	3	4	5
68	0	I	2	4	5	6
70	0	I	3	5	6	7